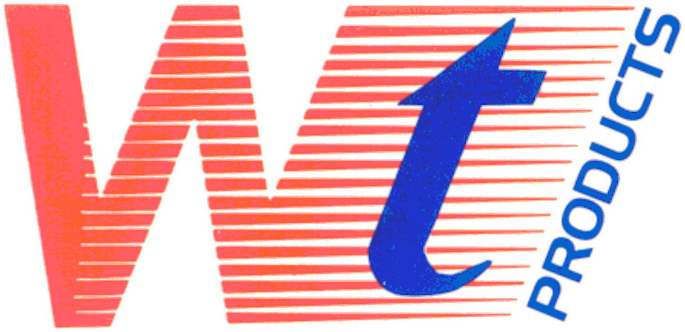

System '2000'
Instruction Manual

Date:	22-11-2004
Options:	**Instructions for the W.T 2000 (V2.04, V2.05)**

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The **W.T 2000** is a combination of a sequential timer and a differential pressure indicator. All of the familiar parameters such as interval and duration time as well as differential pressure alarm trips, are well catered for. But the **W.T 2000** breaks away from the traditional design of using lots of individual adjustment pots to alter parameters such as interval and duration. And replaces them with a user interface, as shown in (fig1).

The new user interface allows the user to select any parameter shown on the left of the panel, by pressing the select button. The default setting is always the READOUT, which is the differential pressure across the filter. Each time the select button is pressed a red led will illuminate opposite the parameter selected. Once the chosen parameter is selected the control knob may be adjusted to change the value of that parameter. The value of the parameter is shown on a Liquid crystal display (LCD). The value may be increased or decreased by turning the control knob clockwise or anti-clockwise. The faster the knob is turned the larger the steps in the displayed value. Once the desired value has been set. Pressing the ENTER button locks that value into the memory of the **W.T 2000**. The ranges and steps of each parameter are shown in (fig2).

If the display shows any value out side of those shown in the table see (fig2) these are not currently available on this model. Pressing the select button again moves onto the next parameter setting. If no selection is made after 5 Minutes the LCD display reverts to the default pressure reading setting. If ENTER is not pressed the value all ready present in the display will not be changed.

PARAMETER	**RANGE**	**INCREMENT STEP**
Alarm 1	0-20.00 in W.G	0.2
High level	0-5.000 Kpa	0.02
Low level	0-508.0 mm W.G	2
Alarm 2	0-50.00 mbar	0.2
No of outputs	0-60	1
Interval	0-21 mins	5 sec
Duration	0-99 sees 980 mS	20 mS
Cycle	0-99mins30sec	30sec
Dirty line	0-99mins30sec	30sec
Down time	0-30 mins	30 sec spec change multiply displayed time by 2

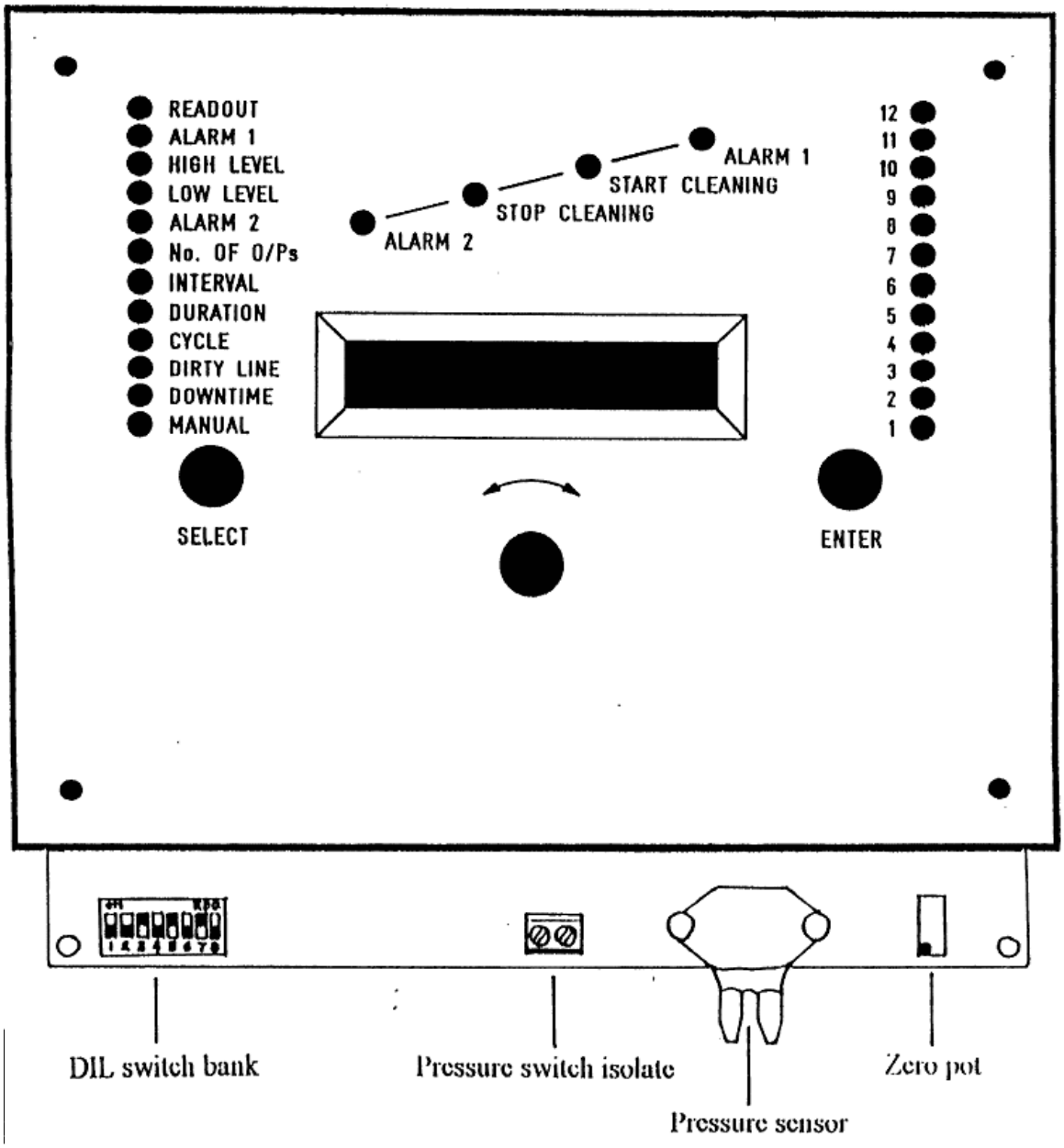
(fig2)

EXAMPLE 1

To change the value of the duration parameter.

The display is showing the default READOUT pressure and the READOUT LED is illuminated Pressing the SELECT button 7 times causes the DURATION LED to illuminate. Turning the control knob in either direction changes the LCD display.

Once the required value has been dialled up on the display, pressing the ENTER button stores that value.



(fig1)

OPTION SWITCHES

From the user interface certain parameters can be turned on or off. This is achieved by removing a blanking plate in the bottom right hand corner of the user interface control panel. Under this panel is a selection of switches, numbered 1 to 8 see fig 3 for a table of their function.

	ON (UP)	OFF (DOWN)
1	Spare not used	Spare not used
2	Enable External start and PLC start	Disable External start and PLC start
3	Enable Differential pressure start	Disable Differential pressure start
4	Cycle Timer on	Cycle Timer off
5	Run to end of sequence after stop signal received When restarted, starts from output 1	Stop in the middle of the sequence. After the stop signal received. When restarted, starts from where it left off in the middle of the sequence.
6	Down Time Cleaning on	Down Time Cleaning off
7	Display Units	
8	Display Units	

7	8	
OFF	OFF	KPa
ON	OFF	mm W.G
OFF	ON	mbar
ON	ON	in W.G

(fig3)

The most useful of the switches are 7 and 8 these allow the pressure unit of measurement to be changed. The pressure units are “in W. G”, “mm W. G”, “mbar” and “Kpa”. These switches allow instant conversion from one scale to another, this could be used as a pressure calculator simply dial up the pressure in “in W.G” and then change the switches to “mm W.G” for an instant conversion. Or if the customer changes his/her mind as to what pressure unit is required, simply changing switch configuration’s solves the problem, and more importantly saves time and no more problems re ordering a unit with the correct pressure scale.

The LCD display has been factory calibrated, The GAIN pot under the cover plate should not be adjusted. But if the display is not at zero or shows the message Neg Pressure. Adjust the ZERO pot under the cover plate. The message Neg Pressure, indicates that the display is reading a negative pressure. The reasons for this could be

that the zero setting has drifted or the HIGH and LOW Differential pressure pipes are reversed.

Connections to the W.T 2000

INPUT VOLTAGE SELECTION

Apply mains to the L and N terminals on the most left hand side connector. Fit a jumper wire from the COM terminal to either the 110, 220 or 240 terminals. Note all these voltages are AC

The unit is fitted with a mains input fuse.
Rating 1 Amp A/S (slow blow)
Type 5 X 20 mm (Farnell part No
(RS part No

AC OUTPUT VOLTAGE SELECTION

The terminal block next to the mains input terminal block sets the output voltage. Fit a jumper wire from the COM terminal to either the 24,110, 220 or 240 terminals. Note all these voltages are AC. It is not possible with this unit to apply a voltage on the input terminals less than the desired output voltage ie input 110 volts and expect 240volts output.

The unit is fitted with an output fuse.
Rating I Amp A/S (slow blow)
Type 5 X 20 mm (Farnell part No
(RS part No

DC OUTPUT VOLTAGE SELECTION

The terminal block next to the mains input terminal block sets the output voltage. Fit a jumper wire from the COM terminal to either the 12, 24, or 48 terminals. Note all these voltages are DC

The unit is fitted with an output fuse.
Rating 2 Amp A/S (slow blow)
Type 5 X 20 mm (Farnell part No
(RS part No

INPUT SPECIAL CONTACTS

V-V	Feedback input is for future development
W-W	External/PLC input (zero volt contact)
X-X PLC INPUT	(voltage input required for relay)
Y-Y DOWN TIME input	(zero volt contact)

Where a contact is shown as Zero volt no voltage should be fed into these contacts. A normally open switch or auxiliary contact should be used. Where a contact is shown as voltage, this is used to power a
relay coil. The relay coil voltage is 110 volts ac. Other voltages are available on request.

OUTPUT SPECIAL CONTACTS

Z-Z	End of cycle output (zero volt contact)
Running	(zero volt contact)
Dirty line	(zero volt contact)
Alarm 1	(zero volt contact)
Alarm 2	(zero volt contact)

Where a contact is shown as zero volt these are 5 Amp relay contacts. The normally open, closed and common contacts are taken to terminals. The only exception to this is the running contact which only has the normally open and common contacts.

OUTPUT SOLENOID TERMINALS AND CONNECTION TO VALVES

The solenoid valves should be chosen to match the units output voltage. And connected onto the output terminals as shown below. Although the sequencer has the capacity to fire two valves per output. It is recommended that only one solenoid valve be connected to each output, but if there is a need to fire more than one valve. Consider the following points

Maximum power transfer on a sequencer is achieved when the input voltage equals the output voltage Worst case power transfer is when the output voltage is less than the input voltage i.e 240v input 24v output

DC valves require more power than AC valves hence a larger or external transformer is required.

Staggering extra valves across the sequencer outputs allows the transformer to recover from power surges. And allows small compressors to recover.

Increasing the interval time and decreasing the duration time allows the sequencer to recover between pulses and limits the length of time the valve is energized.

Because the solenoid valve is basically a coil, it represents an inductive load. Inductive loads when switched offer cause a voltage kick back. In other words they feed a voltage back into the sequencer which is usually much higher than the voltage which was originally supplied to it. Although steps have been taken to reduce the effects of this spike and the damage it can cause. It is clear that two valves cause twice the problem.

EMC

From an EMC point of view radiated emissions EN50081-2 -1993 should be kept as low as possible. And steps to comply should be as follows.

a) Fit solenoids in a metal enclosure, or polycarbonate enclosure sprayed with Nickel conductive paint.

b) Use screened lead for interwiring of valves to sequencer and earth only one end of the screen. Only if valves are mounted away from the sequencer.

c) Fit varistors or ballast capacitors across the solenoid valves. Only if valves are mounted away from the sequencer.

d) Route solenoid wiring away from high power or signal wires Thus complying to EN50081 -2-1993 missions and EN50082-2-1 992 Immunity.

e) Where possible bring two or more common return wires back to the sequencer. If a return cable breaks the valves can still fire, by feeding through other valves. But this has the effect of firing multiple valves at once, and does not offer a means of discharging the inductive kick back spike. By building double redundancy into the system, this possible fault and EMC nightmare can be eliminated.

Example 1

Question I have a 12 output sequencer unit and 16 valves what's the best way of wiring the valves to the sequencer.

Answer 16 - 12 = 4 extra valves

When firing two valves simultaneously the drain of compressed air can put a strain on the compressor to constantly recharge. And the electrical load on the sequencer can be reduced by fitting the extra valves staggered across the 12 outputs

Output No	1	2	3	4	5	6	7	8	9	10	etc
Valves	*	*	*	*	*	*	*	*	*	*	
Extra Valves	*		*		*		*				

The LCD Display

As well as showing the value of each parameter on the LCD display, a number is shown on the right hand side of the display (see fig4). This number refers to which Sequencer card is in operation, the MASTER board which is outputs 1-12 would bring up a 1 on the display. If the number of outputs is set to higher than 12 indicating that a SLAVE board is fitted with another 12 outputs. These would be outputs 13-24 which brings up a 2 on the display.

(FIG4)

This numbering system on the LCD display is linked to the column of red LEDs on the user interface. From the column of 12 LEDs we can see that if the 4th LED up is lit and a 1 is displayed on the LCD display then we are switching output 4 on. But if we have the 4th LED up lit and the display shows a 2 then we are switching output (12+4)=16 on.

Once all the parameters have been set, a quick way to check all the settings. Is to press the ENTER button when the display is in it's READOUT position, this will cause each parameter to be displayed one after the other. Then automatically return to READOUT.

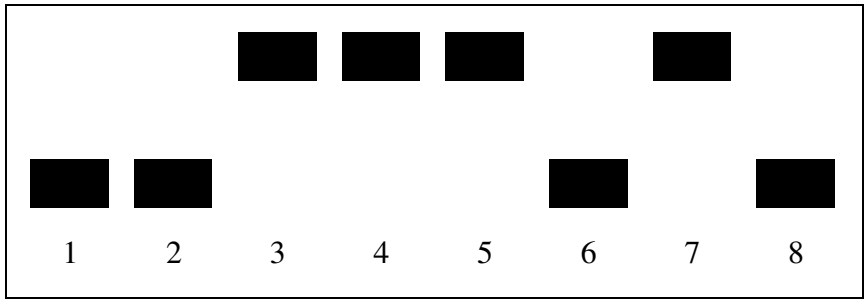
IMPORTANT NOTES

The RUN to END function allows the sequence to carry onto the end of it's cycle even though the input signal to the WT 2000 is no longer present. An example of this could be a high differential pressure has caused cleaning to be initiated. The solenoid valves operated from outputs 1 to 8 have reduced the differential pressure to acceptable levels. The sequence will continue from 8 to the last output valve which on a single board WT 2000 would be 12. This RUN to END function ensures all bags are cleaned evenly.
The STOP MID CYCLE function stops the cycle where ever it was in the sequence, when the input signal to the WT 2000 is no longer present. The front panel column of LED's on the right of the display will stay illuminated to show how far through the sequence the unit was before it was stopped. Note this is only an indication of which outputs have fired, and does not mean that they are all on.When the WT 2000 is next called upon to clean the sequence will carry on where it left off.

Example settings for the Universal 2000

Alarm 1	126 mm W.G (Approx 5.0 in W.G)
High level	90 mm W.G (Approx 4.6 in W.G)
Low level	40.6 mm W.G (Approx 1.6 in W.G)
Alarm 2	304.0 mm W.G (Approx 10.0 in W.G)
No of Outputs	12
Interval	00 min 15 s
Duration	00 s 300 ms
Cycle	00 s
Dirty line	60 min
Down time	30 min

DIL Switch settings



1 Spare
2 External/PLC start
3 Differential pressure start
4 Cycle timer
5 Run to end/stop mid cycle
6 Down time cleaning
7 Pressure display (set to mm W.G)
8 Pressure display (set to mm W.G)

With the above set up the unit will operate in the following manner.

Switch 2/is off therefore the unit can not be started from an external source, such as a manual start switch, PLC, or external pressure switch.

Switch 3/is on therefore the unit will operate from its internal pressure sensor, and will initiate cleaning when the differential pressure rises to it's set trip points.

Switch 4/is on and its value is set to 00 min 00 s. Usually this will be set to a value typically 1 hour but if set to zero will cause the unit to clean continuously. This is ideal for installation testing.
Usually one cleaning will be initiated every 1 hour (60 min), this can be used as a back up to differential pressure start. Or as an occasional clean.

Switch 5/is on which means the filters will all be cleaned from start to finish

Switch 6/is off which means any value set is ignored. But for operating neatness, they are normally set to their maximum or minimum values.

Switches 7/ and 8/ work in conjunction with each other and with 7/ on and 8/ off. The display is configured in mm W.G

Readout - Alpha numeric

This displays the pressure across the filter at all times, and indicates the units of measurement being used. As pressure measurement is known by different units, eg- insWg, mms water, Kilopascals or mBar, a selector switch is incorporated in the unit allowing selection of the preferred units.

Alarm 1 - High

This is the higher value in the pressure range and will offer a changeover, volt free contact which activates at the preselected value, remaining in that attitude as long as the pressure remains above the value set.

High Level Differential

The upper value of the cleaning differential is set and provided the pressure increases to above this setting, a command to start cleaning will be given. The cleaning command remains until the lower level is attained.

Low Level Differential

The level set by this parameter will be the level where the cleaning command will switch off. It should be noted that the difference between the two levels should be sufficient to ensure hunting does not take place.

Alarm 2 - low

This parameter controls a volt free contact but works in reverse. On switch-on, the differential pressure will quickly go above this setting and switch the alarm off. However, should the main fan stop prematurely, or a serious rupture of a significant element become a reality, then the alarm will operate. Delay in operation is built-in.

Number of Outputs

When selected, the centre knob is rotated to any desired number from o - 60, the output location indicated by means of the LEDs and readout. The controller must be equipped with the correct number of output boards (in multiples of twelve) to deliver the number of outputs required.

Interval

The Interval time can be set in minutes and seconds. The minimum value that can be set is 0 seconds, the maximum being 4 minutes, accurate to 1 second.

Duration

Similarly, the duration is adjustable from 20 milliseconds to 10 seconds, in steps of 5 milliseconds. The accuracy is within 5 milliseconds.

Cycle

This feature calls for a cleaning operation to be carried out on all valves selected at regular intervals, preset by this command, and can be set from one minute up to 99 minutes and 40 seconds. It is a means of maintaining a working continuity, especially under light dust loads when the unit might not call for cleaning for prolonged periods.

Dirty Line

This timer has been included to operate an output signal in the shape of a volt free contact with a set time of 5 seconds, and up to a preset time of 99 minutes in 30 second steps. With a changeover valve connected to a suitable air supply (eg-4lbs/sq.ins), we can disconnect the high pressure (dirty line) and blow down the tube at regular intervals.

Downtime

This feature is often required to ensure a prolonged cleaning period, and can be initiated after the main fan has been switched off. This will have to be signalled to the unit from the main contactor, and the supply maintained. Alternatively, if the downtime has been selected, the timer will commence as soon the pressure is no longer detected.

Manual Start

This parameter allows the operating engineer to manually run through the operation he has just set up. It allows a run through of all the valves and then parks until the differential pressure calls for cleaning. If, at any time, a parameter is called up and a different setting introduced but not entered, this setting will be held on display for up to 2 minutes, but after that time the unit will return to readout and the setting will revert to the original setting.

The Universal 2000 Sequential Timer

The new range of sequential controls has been developed to provide a greater accuracy for timed sequences, a far simpler setting up procedure and a greater number of options to aid the filter manufacturer. The layout of the panel is such that only two push buttons and a rotary encoder are used to change or reset any one of eleven different parameters. In addition, the fundamental timing clock is quartz controlled ensuring every unit will have extreme accuracy in the different parameters, and every limit produced will be identical.

A unique feature is that if the main power is switched off at any time, the unit will remember the last set of commands. When switched on again, it will then proceed

to self-test all circuits by illuminating all the LEDs in turn, then park, showing the LED for readout and the screen showing the company name.

Setting up for the appropriate parameter is achieved by repeat pressing of the select button until the LED arrives at the parameter required. You can increase the setting by rotating the centre knob clockwise, or decrease the setting by turning anti-clockwise. A feature of this control is that the faster you turn the knob, the bigger the steps taken to modify the display value. On reaching the desired value, the enter button is pressed which fixes the new value into the memory. Should the enter button not be pressed, the new setting is not recorded and the unit reverts to its original setting.

If you accidentally pass the parameter you require, then the select button is pressed repeatedly, the LEDs lighting down the parameters back, to the readout, and then onto the parameters again. Provided you pause between selection of parameters the LCD readout will read the present setting.

The LEDs on the right hand side will show the step function of the outputs which will remain illuminated through the progress to No. 12. If a greater number than 12 has been chosen, a figure 2 will display in the right hand side of the readout once the second board has commenced, showing that the LEDs are operating on the second board. This will be the case up to 60 outputs in which case the figure will range from 1 - 5.

Factors have been introduced with this design to ensure the unit meets the requirements of E.M.C. criteria. The unit has been designed to accept an operating signal other than from the inbuilt transducer, but the signal will need to be conditioned to meet full scale deflection of 4 - 20mA for a reading of 20 insWg, 50 mBar or 5KPa. Should the need arise for an additional readout, a serial port is provided which will give identical readings to the LCD on the unit.